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Roof extension for a utility vehicle cab

The invention relates to a roof extension for a utility vehicle cab which comprises a left A pillar in the forward travel direction and a right A pillar in the forward travel direction and also at least one rear left pillar and at least one rear right pillar arranged behind a door cutout in the forward travel direction, the roof extension comprising at least two roof bows which are covered by a roof covering.

A supporting framework for a cab of a utility vehicle is known from US patent specification 6,315,351. The supporting framework has altogether three roof bows, two of which are oriented in the direction of travel and a third of which is oriented transversely to the direction of travel. The roof bows serve for stabilizing the supporting framework of the cab.

It is an object of the invention to provide a roof extension for a cab which has great stability and is capable of stabilizing the cab in the event of a vehicle collision as well.

This object is achieved by a roof extension for a utility vehicle cab which comprises a left A pillar in the forward travel direction and a right A pillar in the forward travel direction and also at least one rear left pillar and at least one rear right pillar arranged behind a door cutout in the forward travel direction, the roof extension comprising at least two roof bows which are covered by a roof covering, in which a first roof bow extends from the left A pillar to the rear right pillar and a second roof bow extends from the right A pillar to the rear left pillar.

The A pillars are the front pillars of the cab of the utility vehicle in the forward travel direction. They are arranged in front of a door cutout of a driver's door in the forward travel direction. The rear pillars may be both pillars which are arranged on side walls of the cab and pillars which are arranged on a rear wall of the cab. The roof bows are arranged in such a way that they start from the A pillars and extend backward at an angle. As the roof bows extend in each case from the A pillar on one side to a rear pillar on the other side, they intersect. Such a topological structure of the roof bows, in which the roof bows are not oriented exclusively in the travel direction or transversely to the travel direction, results in particularly great stability of the structure of the cab. A high degree of safety for the occupants of the cab is achieved, in particular when a collision with associated force action takes place at an angle from the front. The structure according to the invention makes a good force flow possible in the event of such a collision. For further stabilization of the cab, it is advantageous to have a number of roof bows extend from the A pillars to different pillars or to combine the roof bows according to the invention starting from the A pillar with other roof bows extending in the travel direction or transversely to the travel direction.

In a development of the invention, a right B pillar is provided as the rear right pillar and a left B pillar is provided as the rear left pillar.

The B pillar is the pillar which is arranged behind the door cutout in the forward travel direction of the vehicle. An improved force flow between the A pillars and the B pillars is ensured by roof bows which extend from the A pillars on one side to the B pillars on the other side in each case.

In a development of the invention, a pillar arranged left of the roof center in the forward travel direction and on the rear wall of the cab is provided as the rear left pillar and a pillar arranged right of the roof center in the forward travel direction and on the rear wall of the cab is provided as the rear right pillar.

This improves in particular the force flow from a front part of the cab into a rear part of the cab.

In a development of the invention, the first roof bow extends from the left A pillar to a right B pillar and the second roof bow extends from the right A pillar to a left B pillar and also a third roof bow extends from the left A pillar to a pillar arranged right of the roof center in the forward travel direction on the rear wall of the cab and a fourth roof bow extends from the right A pillar to a pillar arranged left of the roof center in the forward travel direction on the rear wall of the cab.

Accordingly, such a structure comprises at least four roof bows, two of which start from the same A pillar in each case. Of these two roof bows of an A pillar, one extends to the B pillar on the opposite side of the vehicle and the other extends to a pillar which is arranged on the opposite side of the vehicle on the rear wall. This structure ensures a very good force flow both between the two sides of the cab and between its front region and rear region. A high degree of stability is achieved and safety for the occupants of the cab is thus ensured.

In a development of the invention, the two roof bows starting from an A pillar are brought together in a region of connection to the A pillar.

In this regard, only one roof bow, which then branches into the two roof bows at a junction, starts from the A pillar. Such an embodiment allows one-piece design of the connection region of two roof bows.

In a development of the invention, the four roof bows enclose a kite-shaped area, one diagonal of which extends in the travel direction and the other diagonal of which extends transversely to the travel direction.

A kite-shaped area is a quadrilateral area which is axially symmetrical in relation to one of its diagonals. The kite-shaped area formed by the roof bows is axially symmetrical in relation to the diagonal pointing in the travel direction. At the front in the forward travel direction, the kite-shaped area is delimited by the roof bows which extend from the A pillars to the B pillars on the opposite side of the cab. On the rear side in the forward travel direction, the kite-shaped area is delimited by the roof bows which extend from the A pillars to the pillars which are arranged on the rear wall of the cab.

In a development of the invention, the roof extension comprises a kite-shaped roof light which is arranged in the kite-shaped area.

Depending on the arrangement of the roof bows, a particularly large roof light is then possible. Such a roof light allows the driver an especially easy exit.

In a development of the invention, the roof extension comprises a rectangular roof light which is aligned approximately parallel to one of the roof bows.

In a development of the invention, a horizontally arranged all-round frame is provided, to which the roof bows are connected.

The frame results in a further increase in the stability of the roof extension. It moreover permits separate assembly of the roof extension before the latter is connected to the cab. In this regard, it can at the same time constitute the delimitations of the roof covering which extends over the roof bows.

In a development of the invention, the roof extension is designed as a high roof which comprises four side parts and a horizontally aligned central part, and the four roof bows in each case comprise three portions, the first portion and the third portion of which extend parallel to in each case one of the side parts of the high roof and the second portion of which extends parallel to the central portion of the high roof.

In this regard, the side parts are preferably arranged in such a way that they form a plane with a side region or with a front region or a rear region of the cab. The first part of each roof bow extends from one of the A pillars either parallel to the left or right side part or parallel to the side part located at the front in the forward travel direction as far as the level of the horizontally aligned central part. The second part of the roof bow extends over the horizontally aligned central part. This is followed by the third part of the roof bow, which extends either parallel to the left or right side part or parallel to the side part located at the rear in the forward travel direction to a rear pillar. The embodiment of the roof extension as a high roof is advantageous in particular as far as aerodynamics are concerned. Air resistance caused by the transition between the cab and the superstructure of the utility vehicle can be reduced by the high roof.

In a development of the invention, two roof bows which extend from the A pillars in each case on one side to

the B pillars in each case on the other side intersect in the region of the transition between the horizontally aligned central part of the high roof and that side part of the high roof located at the front in the forward travel direction.

This arrangement results in increased stability and thus increased safety.

In a development of the invention, two roof bows which extend from the A pillars in each case on one side to pillars which are arranged in each case on the other side in the forward travel direction on the rear wall of the cab intersect in the region of the horizontally aligned central part of the high roof.

The underlying object can likewise be achieved by a utility vehicle cab with a roof extension according to the invention.

Such a cab has great stability as a function of the number and the arrangement of the roof bows and ensures a high degree of safety for the occupants. The roof extension can be either detachably or firmly connected to the cab.

Further features and advantages of the invention emerge from the claims and the following description of two preferred embodiments of the invention in conjunction with the drawings, in which:

fig. 1 shows a perspective, diagrammatic illustration of a first embodiment of the roof extension according to the invention, and

fig. 2 shows a perspective, diagrammatic part view of a roof extension according to the invention in a second embodiment.

Fig. 1 shows a roof extension 10 according to the invention with four roof bows 12, 14, 16, 18. Two A pillars 20, 22, two B pillars 24, 26 and two rear wall pillars 28, 30 can moreover be seen. Furthermore, a frame 32 is also provided, to which the roof bows 12, 14, 16, 18 are connected. A roof covering 34 is illustrated in dashed lines.

The A pillars 20, 22 are located left and right of a windscreen 38 in the forward travel direction 36 and are arranged in front of door cutouts 40, 42. The B pillars 24, 26 are arranged behind the door cutouts 40, 42 in the forward travel direction 36. The rear wall pillars 28, 30 are arranged at the rear in the forward travel direction 36. The all-round, closed frame 32 rests on all six pillars 20, 22, 24, 26, 28, 30. The four roof bows 12, 14, 16, 18 start from the frame. Two roof bows 12, 14 extend from the A pillars 20, 22 to the B pillars 24, 26. In this regard, they are designed in such a way that in each case a first portion 12a, 14a of the roof bows 12, 14 extends parallel to a part of the roof covering 34 facing forward in the travel direction 36, that in each case a second portion 12b, 14b extends parallel to a horizontal central part of the roof covering 34 and that in each case a third portion 12c, 14c extends parallel to the left or right part of the roof covering 34. In this connection, the two roof bows 12, 14 intersect between the first portion 12a and the second portion 12b of the first roof bow 12 and also the first portion 14a and the second portion 14b of the second roof bow 14. The intersection location is accordingly arranged between the central part of the roof covering 34 and the front part of the roof covering 34 facing in the forward travel direction 36, approximately on the front edge of the roof. The third roof bow 16 and the fourth roof bow 18 extend from the A pillars 20, 22 to the rear wall

pillars 28, 30. In this regard, they are designed in such a way that in each case a first portion 16a, 18a extends in a transition region between that part of the roof covering 34 facing forward in the forward travel direction 36 and the left or right part of the roof covering 34, that in each case a second portion 16b, 18b extends parallel to the central part of the roof covering 34 and that in each case a third portion 16c, 18c extends parallel to a part of the roof covering 34 located at the rear in the forward travel direction 36. The third roof bow 16 and the fourth roof bow 18 intersect in the rear region of the horizontal central part of the roof covering 34.

The roof bow arrangement illustrated ensures great stability in relation to forces which act on the cab counter to the forward travel direction 36. The topological structure of the roof bows 12, 14, 16, 18 is particularly suitable for ensuring stability when forces act on the cab from a direction 44 at an angle from the front, for example in the event of a collision at an angle from the front.

Fig. 2 shows a perspective illustration of a second embodiment of a roof extension 58 according to the invention. The illustration shows part of a cab of a utility vehicle with a windscreen 50, a door cutout 52 and a left A pillar 54 and a left B pillar 56. The cab is provided with the roof extension 58 according to the invention, which comprises a frame 60 and a number of roof bows 62, 64, 66.

The special feature of this embodiment is that the roof bows 62, 64 which start from the left A pillar 54 have a common connection region 68. The roof bows 62, 64 are connected to the frame 60 by means of this common connection region 68. Above the connection region 68, the two roof bows 62, 64 divide and extend separately

from one another. In this regard, the connection region 68 is designed in such a way in its shape and size that it can at the same time ensure the force flow into the roof bows 62 and 64.